Claims

1. A method for producing a web of tissue, in which the web of tissue (103) is led over at least one drying cylinder (101), doctored off the latter with a creping doctor (104) and then wound up by means of a winding device (105), characterized in that the web of tissue (103) is supported at least largely over the entire distance between creping doctor (104) and winding device (105) on one side by a transfer means (109), so that there is in any case only a short free web draw (113), while its other side is free.

2. The method as claimed in claim 1, characterized in that the free web draw (113) is less than 1 m, preferably less than 0.5 m.

3. The method as claimed in claim 1 or 2, characterized in that the transfer means (109) is arranged on the underside of the web of tissue (103) and in particular begins underneath the creping doctor (104).

4. The method as claimed in one of the preceding claims, characterized in that the transfer means (109) used is a belt, an embossing belt, a felt, an embossing felt, a membrane, in particular a Spectra membrane, or a fabric.

5. The method as claimed in one of the preceding claims, characterized in that the transfer means (109) is led through the winding nip (110) of the winding device (105) with the web of tissue (103).

6. The method for producing a web of tissue, in which the web of tissue (103) is led over at least one

drying cylinder (101), doctored off the latter with a creping doctor (104) and then wound up by means of a winding device (105), in particular as claimed in one of the preceding claims, characterized in that the web of tissue (103) is subjected to a patterning operation in the winding nip (110).

7. The method as claimed in one of the preceding claims, characterized in that the transfer means used is a structured material, in particular a TAD belt.

8. The method as claimed in one of the preceding claims, characterized in that the line force produced in the winding nip (110) is reduced as compared with conventional methods.

9. The method as claimed in one of the preceding claims, characterized in that the line force produced in the winding nip is chosen to be about 0.2 kN/m.

10. The method for producing a web of tissue, in which the web of tissue (103) is led over at least one drying cylinder (101), doctored off the latter with a creping doctor (104) and then wound up by means of a winding device (105), in particular as claimed in one of the preceding claims, characterized in that the web of tissue (103) is subjected to wet forming between drying cylinder (101) and winding device (105).

11. The method as claimed in one of the preceding claims, characterized in that the web of tissue (103) is rewetted and has vacuum applied to it in the supported region.

12. The method as claimed in claim 11, characterized in that the rewetting is carried out before or at the same time as the application of vacuum.

13. The method as claimed in claim 11 or 12, characterized in that the web of tissue (103) is wetted on its upper side and has vacuum applied to its underside.

14. The method as claimed in one of claims 11 to 13, characterized in that the web of tissue (103) is dried again after the rewetting and the application of vacuum.

15. The method as claimed in claim 14, characterized in that the renewed drying is carried out by means of infrared, at least one drying hood and/or at least one drying cylinder.

16. The method as claimed in one of the preceding claims, characterized in that the dryness at the creping doctor (104) is chosen to be between about 70% and about 100%, in particular between about 93% and about 98%.

17. The method as claimed in one of claims 1 to 15, characterized in that the web of tissue (103) is moist at the creping doctor (104), in particular has a moisture level between 94% and 98% or a moisture level up to 70%.

18. The method as claimed in one of the preceding claims, characterized in that the creping rate is chosen to be between about 0% and about 50%, in particular between about 10% and about 25%.

19. The method as claimed in one of the preceding claims, characterized in that the production is carried out without a threading system.

20. The method as claimed in one of the preceding claims, characterized in that the web of tissue (3) is sucked onto the transfer means (9) in order to assist the transfer of the web of tissue (103).

21. The method as claimed in one of the preceding claims, characterized in that the web of tissue (103) is blown after the creping doctor (104) in order to assist the transfer of the web of tissue (103) onto the transfer means (109).

22. The method as claimed in one of the preceding claims, characterized in that the threading of the web of tissue (103) onto the winding drum (107) is carried out as in the case of conventional winding drums.

23. The method as claimed in one of the preceding claims, characterized in that an uncovered winding drum (107) is used.

24. The method as claimed in one of claims 1 to 22, characterized in that a covered winding ton (107) is used.

25. The method as claimed in one of the preceding claims, characterized in that a winding drum (107) having a smooth shell, a blind-drilled shell, a drilled shell or a shell provided with grooves is used.

26. The method as claimed in one of the preceding claims, characterized in that a pulper (122, 123)

is used under the drying cylinder (101) and/or under the winding device (105).

27. The method as claimed in claim 26, characterized in that excess paper present on the winding drum (107) is blown off into the pulper (123).

28. The method as claimed in one of the preceding claims, characterized in that an air deflector or doctor (117) is used on the winding drum (107).

29. The method as claimed in one of the preceding claims, characterized by the use for tissue with low basis weight.

30. The method as claimed in one of the preceding claims, characterized by the use for tissue with low compressive strength.

31. The method as claimed one of the preceding claims for producing a web of tissue (12) by means of a tissue machine (10) having a headbox (14) and an endless carrier belt (16), with which the web of tissue (12) is led through a press nip (22) formed between a drying cylinder (18) and a backing unit (20), the headbox used being a multilayer headbox (14), at least two grades of stock being supplied to this multilayer headbox (14) and the tissue web (12) being wound up by means of a winding device (24) after the press nip (22), the hardness of the roll (80) produced preferably being influenced in a predefined way, in particular controlled and/or regulated.

32. The method as claimed in one of the preceding claims, characterized in that the drying cylinder (18) used is a Yankee cylinder.

33. The method as claimed in one of the preceding claims, characterized in that the line force produced in the winding nip (26) is chosen to be less than or equal to 0.8 kN/m.

34. The method as claimed in one of the preceding claims, characterized in that a former having two circulating endless belts (16, 28) is used, which run together, forming a stock inlet gap (30), and are then led over a forming element (32), such as in particular a forming roll, the inner belt coming into contact with the forming element (32) preferably forming the transport belt (16).

35. The method as claimed in one of the preceding claims, characterized in that a Crescent former is used, whose inner belt (16) is formed by a felt.

36. The method as claimed in one of the preceding claims, characterized in the web of tissue (12) is led through at least one shoe press (18, 20) together with the carrier belt (16).

37. The method as claimed in claim 6, characterized in that a shoe press unit is expediently used as the backing unit (20) assigned to the drying cylinder (18).

38. The method as claimed in one of the preceding claims, characterized in that the web of tissue is doctored off the drying cylinder by means of a creping doctor, in particular a thin creping doctor.

39. The method as claimed in one of the preceding claims, characterized in that one or more of the following grades of stock are used:
- hardwood fibers, in particular short fiber chemical pulps
- fibers made of softwood, in particular long fiber chemical pulps
- CTMP (chemical-thermomechanical pulp).

40. The method as claimed in one of the preceding claims, characterized in that a mixture of grades of stock is used in which the proportion of hardwood fibers lies in a range from about 50% to about 80%.

41. The method as claimed in one of the preceding claims, characterized in that a mixture of grades of stock is used in which the proportion of softwood fibers lies in a range from about 20% to about 50%.

42. The method as claimed in one of the preceding claims, characterized in that a mixture of grades of stock is used in which the proportion of CTMP (chemical-thermomechanical pulp) lies in a range from 0% to about 20%.

43. The method as claimed in one of the preceding claims, characterized in that the web of tissue (12) is led around the drying cylinder (18) after the press nip (22), the drying in the relevant wrap region preferably being intensified by a drying hood (38).

44. The method as claimed in one of the preceding claims, characterized in that at least two different grades of stock are supplied to the

multilayer headbox (14) and, in this case, short fibers obtained from hardwood are used for the layer of the web of tissue (12) facing the drying cylinder surface, and long fibers obtained from softwood are used for the layer provided on the opposite web side.

45. The method as claimed in claim 44, characterized in that CTMP (chemical-thermomechanical pulp) is additionally used for the layer provided on the opposite web side.

46. The method as claimed in claim 45, characterized in that short fibers are additionally used for the layer provided on the opposite web side.

47. The method as claimed in one of the preceding claims, characterized in that a multilayer headbox (14) is preferably used, whose nozzle (46) is subdivided into at least two channels (50, 52) by at least one slat (48) extending over the entire machine width.

48. The method as claimed in claim 47, characterized in that the nozzle (46) is subdivided at least substantially symmetrically into two channels (50, 52) by a slat (48).

49. The method as claimed in claim 47 or 48, characterized in that the slat (48) extends outward beyond the nozzle (46) in the region of the outlet gap (54).

50. The method as claimed in one of the preceding claims, characterized in that a multilayer headbox (14) having sectional dilution water regulation and/or control over the machine width is used.

51. The method as claimed in claim 50, characterized in that, for at least two layers, sectional dilution water regulation and/or control is provided over the machine width in each case.

52. The method as claimed in claim 50 or 51, characterized in that dilution water regulation and/or control is provided at least for the layer facing the forming roll (32).

53. The method as claimed in one of the preceding claims, characterized in that the proportion of the drying provided by the drying hood (38) for drying the web of tissue (12) is chosen to be higher than the proportion of the drying provided by the drying cylinder (18).

54. The method as claimed in claim 53, characterized in that the ratio between the proportion of the drying of the drying hood (38) and the proportion of the drying of the drying cylinder (18) is chosen to be greater than 55:45, in particular greater than or equal to 60:30, in particular greater than or equal to 65:35 and preferably greater than or equal to 70:30.

55. The method as claimed in one of the preceding claims, characterized in that the drying hood (38) is preferably operated at a temperature which is greater than or equal to 400°C, in particular greater than or equal to 500°C, in particular greater than or equal to 600°C and preferably greater than or equal to 700°C.

56. The method as claimed in one of the preceding claims, characterized in that a value for the

steam pressure in the drying cylinder (18) is chosen which is less than or equal to 0.7 MPa, in particular less than or equal to 0.6 MPa and preferably less than or equal to 0.5 MPa.

57. The method as claimed in one of the preceding claims, characterized in that a winding device (24) is used in which the web of tissue (12) is led over a carrier drum (40) and is then wound up onto a spool (42), both the carrier drum (40) and the spool (42) preferably each being assigned a drive (44).

58. The method as claimed in claim 57, characterized in that the line force produced in the winding nip (26) between the carrier drum (40) and the spool (42) is chosen to be less than or equal to 0.8 kN/m, in particular less than or equal to 0.5 kN/m and preferably less than or equal to 0.2 kN/m.

59. The method as claimed in claim 57 or 58, characterized in that the maximum difference between the circumferential speed of the roll (80) and the circumferential speed of the carrier drum (40) is preferably less than 10% of the circumferential speed of the carrier drum (40).

60. The method as claimed in one of the preceding claims, characterized in that the web draw between the drying cylinder (18) and the carrier drum (40) is set to a predefinable desired value in particular controlled and/or regulated, via the drive (44) assigned to the carrier drum (40), irrespective of the line force produced in the winding nip (26).

61. The method as claimed in one of the preceding claims, characterized in that the drive (44) assigned to the spool (42) is controlled and/or regulated as a function of the speed of the carrier drum (40).

62. The method as claimed in one of the preceding claims, characterized in that the carrier drum (40) is mounted in a fixed location and the spool (42) can be moved.

63. The method as claimed in claim 62, characterized in that the growth in the roll diameter (D) is compensated for by means of an appropriate movement of the spool (42).

64. The method as claimed in claim 62 or 63, characterized in that the line force in the winding nip (26) is set via the movable spool (42).

65. The method as claimed in one of the preceding claims, characterized in that a common control loop is used to compensate for the roll diameter growth and to set the line force in the winding nip (26).

66. The method as claimed in one of the preceding claims, characterized in that the line force in the winding nip (26) is determined via at least one force sensor and this line force is regulated by means of moving the spool (42) appropriately.

67. The method as claimed in one of the preceding claims, characterized in that, in particular in the case of line forces in the winding nip (26) which are less than or equal to 0.5 kN/m and in

particular less than or equal to 0.2 kN/m, the movable spool is displacement-controlled.

68. The method as claimed in claim 67, characterized in that the roll diameter (D) and the position of the spool (42) or the roll (80) formed on the latter relative to the carrier drum (40) are used as measured variables for the displacement control.

69. The method as claimed in one of the preceding claims, characterized in that the position of the wound roll (80) is measured in particular by sensors such as LVDTs (linear variable differential transformer) or the like.

70. The method as claimed in one of the preceding claims, characterized in that, for the purpose of setting and controlling and/or regulating the line force in the winding nip (26), the region of the winding nip (26) is monitored appropriately by means of a CCD camera.

71. The method as claimed in claim 70, characterized in that, by means of the CCD camera, the respective distance (A) between the carrier drum (40) and the spool (42) or the roll (80) formed on the latter is registered.

72. The method as claimed in one of the preceding claims, characterized in that the drive assigned to the spool is not changed during the winding operation.

73. The method as claimed in one of the preceding claims, characterized in that the mass per unit area of the web of tissue (12) in the uncreped

state lies in a range from about 11 g/m^2 to about 20 g/m^2 and in the creped state lies in a range from about 14 g/m^2 to about 24 g/m^2.

74. The method as claimed in one of the preceding claims, characterized in that use is made of a Crescent former whose inner or carrier belt (16), formed by a felt, together with the web of tissue (12), is led over at least one evacuated device (34) before the press nip (22) in the web running direction (L).

75. The method as claimed in claim 74, characterized in that the evacuated device comprises a suction roll (34).

76. The method as claimed in one of the preceding claims, characterized in that the outer belt provided in the region of the forming element (32) of the Crescent former is formed by a wire fabric (28).

77. The method as claimed in one of the preceding claims, characterized in that a shoe press (18, 20) having a shoe length measured in the web running direction (L) of greater than or equal to 80 mm and preferably greater than or equal to 120 mm is used.

78. The method as claimed in one of the preceding claims, characterized in that, by means of the shoe press (18, 20), a line force which lies in a range from about 60 kN/m to about 90 kN/m is produced.

79. The method as claimed in one of the preceding claims, characterized in that the maximum pressing

pressure in the press nip of the shoe press (18, 20) is chosen to be less than or equal to 2 bar and preferably less than or equal to 1.5 bar.

80. The method as claimed in one of the preceding claims, characterized in that the shoe press (18, 20) comprises a shoe press unit (20) having a blind-drilled press shell.

81. The method as claimed in one of the preceding claims, characterized in that a drying cylinder or Yankee cylinder (18) provided with reinforcing ribs in the interior is used.

82. The method as claimed in one of the preceding claims, characterized in that the thickness (b) of the creping doctor (36) is less than or equal to 0.9 mm.

83. The method as claimed in one of the preceding claims, characterized in that the angle of attack ( ) between the tangent (76) to the drying cylinder (18) and the creping doctor (36) is less than or equal to 20°.

84. The method as claimed in one of the preceding claims, characterized in that the rake angle (β) of the creping doctor (36) is greater than or equal to 15°.

85. A device for producing a web of tissue, having at least one drying cylinder (101), a creping doctor (104) arranged on the drying cylinder (101) and a winding device (105) for winding up the web of tissue (103) characterized in that, between the creping doctor (104) and winding device (105), a transfer means (109) that at least largely bridges

the entire distance is provided which supports the web of tissue (103) on one side, so that there is in any case only a short free web draw (113), but leaves its other side free.

86. The device as claimed in claim 85, characterized in that the free web draw is < 1 m, preferably < 0.5 m.

87. The device as claimed in claim 85 or 86, characterized in that the transfer means (109) is arranged on the underside of the web of tissue (103) and in particular begins underneath the creping doctor (104).

88. The device as claimed in one of claims 85 to 87, characterized in that the transfer means (109) provided is a belt, an embossing belt, a felt, an embossing felt, a membrane, in particular a Spectra membrane.

89. The device as claimed in one of claims 85 to 88, characterized in that the transfer means (109) is led through the central nip (110) of the winding device (105) with the web of tissue (103).

90. The device for producing a web of tissue, having at least one drying cylinder (101), a creping doctor (104) arranged on the drying cylinder (101) and a winding device (105) for winding up the web of tissue (103), in particular as claimed in one of claims 85 to 89, characterized in that means are provided to subject the web of tissue (3) to a patterning operation in the winding nip (110).

91. The device as claimed in one of claims 85 to 90, characterized in that the transfer means used is a structured material, in particular a TAD belt.

92. The device as claimed in one of claims 85 to 91, characterized in that the line force produced in the winding nip is reduced as compared with conventional devices.

93. The device as claimed in one of claims 85 to 92, characterized in that the line force produced in the winding nip (110) is chosen to be about 0.2 kN/m.

94. The device for producing a web of tissue, having at least one drying cylinder (101), a creping doctor (104) arranged on the drying cylinder (101) and a winding device (105) for winding up the web of tissue (103), in particular as claimed in one of claims 85 to 93, characterized in that means are provided to subject the web of tissue (103) to wet formation between drying cylinder (101) and winding device (105).

95. The device as claimed in one of claims 85 to 94, characterized in that means for rewetting and applying a vacuum to the web of tissue (103) are provided in the supported region of the web of tissue (103).

96. The device as claimed in claim 95, characterized in that the rewetting means are arranged before or by the means for applying vacuum.

97. The device as claimed in claim 95 or 96, characterized in that the rewetting means are arranged on the upper side of the web of tissue

(103) and the means for applying vacuum are arranged on its underside.

98. The device as claimed in one of claims 95 to 97, characterized in that drying means (120, 121) are provided after the rewetting means (118) and after the means (119) for applying vacuum.

99. The device as claimed in claim 98, characterized in that at least one infrared drying device (120, 121), a drying hood and/or a drying cylinder are provided.

100. The device as claimed in one of claims 85 to 99, characterized in that the dryness at the creping doctor (104) is between about 70% and about 100%, in particular between about 93% and about 98%.

101. The device as claimed in one of claims 85 to 100, characterized in that the web of tissue (103) is moist at the creping doctor (104), in particular has a moisture level of ....

102. The device as claimed in one of claims 85 to 101, characterized in that the creping rate is between about 0% and about 50%, in particular between about 10% and about 25%.

103. The device as claimed in one of claims 85 to 102, characterized in that no threading system is provided.

104. The device as claimed in one of claims 85 to 103, characterized in that means for applying vacuum to the web of tissue (103) are provided after the creping doctor (104).

105. The device as claimed in one of claims 85 to 104, characterized in that means for blowing on the web of tissue (103) are provided after the creping doctor (104).

106. The device as claimed in one of claims 85 to 105, characterized in that conventional filling means are provided for leading the web of tissue (103) onto the winding drum (107).

107. The device as claimed in one of claims 85 to 106, characterized in that the winding drum (107) is uncovered.

108. The device as claimed in one of claims 85 to 106, characterized in that the winding drum (107) is covered.

109. The device as claimed in one of claims 85 to 108, characterized in that the winding drum (107) has a smooth shell, a blind-drilled shell, a drilled shell or a shell provided with grooves.

110. The device as claimed in one of claims 85 to 109, characterized in that a pulper (122) is arranged under the drying cylinder (101).

111. The device as claimed in one of claims 85 to 110, characterized in that a pulper (123) is arranged under the winding device (105).

112. The device as claimed in claim 111, characterized in that there are means for blowing off excess paper present on the winding drum (107) into the pulper (123).

113. The device as claimed in one of claims 85 to 112, characterized in that an air deflector or doctor (117) is arranged on the winding drum (107).

114. The device as claimed in one of claims 85 to 113, characterized by the use for tissue with low basis weight and/or low tensile strength.

115. The device as claimed in one of claims 85 to 114 for producing a web of tissue (112), in particular for carrying out the method as claimed in one of the preceding claims, having a headbox (114) and an endless carrier belt (116), with which the web of tissue (112) is led to a press nip (122) formed between a drying cylinder (119) and a backing unit (120), and having a winding device (124) for subsequently winding up the web of tissue (112), the headbox (114) provided being a multilayer headbox, to which at least two grades of stock can be supplied, and means (184, 186, 192) preferably being provided in order to influence, in particular to control and/or regulate, the hardness of the roll (80) produced in a predefined way as the web of tissue (112) is wound up.

116. The device as claimed in claim 115, characterized in that the drying cylinder (118) provided is a Yankee cylinder.

117. The device as claimed in claim 115 or 116, characterized in that the line force produced in the winding nip (126) is less than or equal to 0.8 kN/m.

118. The device as claimed in one of claims 85 to 117, characterized in that a former having two circulating endless belts (116, 128) is provided,

which run together, forming a stock inlet gap (130), and are then led over a forming element (132), such as in particular a forming roll, the inner belt coming into contact with the forming element (132) preferably forming the transport belt (116).

119. The device as claimed in one of claims 85 to 118, characterized in that a Crescent former is provided, whose inner belt (116) is formed by a felt.

120. The device as claimed in one of claims 85 to 119, characterized in that the web of tissue (112) is led through at least one shoe press (118, 120) together with the carrier belt (116).

121. The device as claimed in claim 120, characterized in that the backing unit (120) assigned to the drying cylinder (118) is formed by a shoe press unit.

122. The device as claimed in one of claims 85 to 121, characterized in that the drying cylinder (118) is assigned a creping doctor (136), in particular a thin creping doctor.

123. The device as claimed in one of claims 85 to 122, characterized in that, after the press nip (122), the web of tissue (112) is led around the drying cylinder (118), a drying hood (138) being provided in order to intensify the drying in the relevant wrap region.

124. The device as claimed in one of claims 85 to 123, characterized in that the nozzle (146) of the multilayer headbox (114) is subdivided into at

least two channels (150, 152) by at least one slat (148) extending over the entire machine width.

125. The device as claimed in claim 122, characterized in that the nozzle (146) is subdivided at least substantially symmetrically into two channels (150, 152) by a slat (148).

126. The device as claimed in claim 124 or 125, characterized in that the slat (148) extends outward beyond the nozzle (146) in the region of the outlet gap (154).

127. The device as claimed in one of claims 85 to 126, characterized in that the multilayer headbox (114) is equipped with sectional dilution water regulation and/or control over the machine width.

128. The device as claimed in claim 127, characterized in that, for at least two layers, sectional dilution water regulation and/or control is provided over the machine width in each case.

129. The device as claimed in claim 127 or 128, characterized in that dilution water regulation and/or control is provided at least for the layer facing the forming roll (132).

130. The device as claimed in one of claims 85 to 129, characterized in that the proportion of the drying provided by the drying hood (138) for drying the web of tissue (112) is chosen to be higher than the proportion of the drying provided by the drying cylinder (118).

131. The device as claimed in claim 130, characterized in that the ratio between the proportion of the

drying of the drying hood (138) and the proportion of the drying of the drying cylinder (118) is chosen to be greater than 55:45, in particular greater than or equal to 60:30, in particular greater than or equal to 65:35 and preferably greater than or equal to 70:30.

132. The device as claimed in one of claims 85 to 131, characterized in that the drying hood (138) can be operated at a temperature which is greater than or equal to 400°C, in particular greater than or equal to 500°C, in particular greater than or equal to 600°C and preferably greater than or equal to 700°C.

133. The device as claimed in one of claims 85 to 132, characterized in that the steam pressure in the drying cylinder (118) is less than or equal to 0.7 MPa, in particular less than or equal to 0.6 MPa and preferably less than or equal to 0.5 MPa.

134. The device as claimed in one of claims 85 to 133, characterized in that, in the winding device (124), the web of tissue (112) is led over a carrier drum (140) and is then wound up onto a spool (142), preferably both the carrier drum (140) and the spool (142) each being assigned a drive (144).

135. The device as claimed in claim 134, characterized in that the line force produced in the winding nip (126) between the carrier drum (140) and the spool (142) is less than or equal to 0.8 kN/m, in particular less than or equal to 0.5 kN/m and preferably less than or equal to 0.2 kN/m.

136. The device as claimed in claim 134 or 135, characterized in that the maximum difference between the circumferential speed of the roll (180) and the circumferential speed of the carrier drum (140) is less than 10% of the circumferential speed of the carrier drum (140).

137. The device as claimed in one of claims 85 to 136, characterized in that the web draw between the drying cylinder (118) and the carrier drum (140) can be set to a predefinable desired value, in particular controlled and/or regulated, via the drive (144) assigned to the carrier drum (140), independently of the line force produced in the winding nip (126).

138. The device as claimed in one of claims 85 to 137, characterized in that the drive (144) assigned to the spool (142) can be controlled and/or regulated as a function of the speed of the carrier drum (140).

139. The device as claimed in one of claims 85 to 138, characterized in that the carrier drum (140) is mounted in a fixed location and the spool (142) can be moved.

140. The device as claimed in claim 139, characterized in that means (184, 186, 192) are provided in order to compensate automatically for the growth of the roll diameter (D) by means of an appropriate movement of the spool (142).

141. The device as claimed in claim 139 or 140, characterized in that means (184, 186, 192) are provided in order to set the line force in the

winding nip (126) automatically and appropriately via the movable spool (142).

142. The device as claimed in one of claims 85 to 141, characterized in that a common control loop is provided in order to compensate for the roll diameter growth and in order to set the line force in the winding nip (126).

143. The device as claimed in one of claims 85 to 142, characterized in that at least one force sensor is provided in order to determine the line force in the winding nip (126), and in that the line force can be regulated by moving the spool (142) appropriately.

144. The device as claimed in one of claims 85 to 143, characterized in that, in particular in the case of line forces in the winding nip (126) which are less than or equal to 0.5 kN/m and in particular less than or equal to 0.2 kN/m, the movable spool (142) is displacement-controlled.

145. The device as claimed in one of claims 85 to 144, characterized in that, for the displacement control, both the position of the spool (142) and the roll (180) formed thereon relative to the carrier drum (140) are used as measured variables of the roll diameter (D).

146. The device as claimed in one of claims 85 to 145, characterized in that sensors such as in particular LVDTs (linear variable differential transformer) or the like are provided in order to measure the position of the wound roll (130).

147. The device as claimed in one of claims 85 to 146, characterized in that, in order to set and control and/or regulate the line force in the winding nip (126), the region of the winding nip (126) can be monitored appropriately by means of a CCD camera.

148. The device as claimed in claim 147, characterized in that, by means of the CCD camera, the respective distance (A) between the carrier drum (140) and the spool (142) or the roll (180) formed on the latter can be registered.

149. The device as claimed in one of claims 85 to 148, characterized in that the inner or carrier belt (116) of the Crescent former, formed by a felt, together with the web of tissue (112), is led over at least one evacuated device (134) before the press nip (122) in the web running direction (L).

150. The device as claimed in claim 149, characterized in that the evacuated device comprises a suction roll (134).

151. The device as claimed in one of claims 85 to 150, characterized in that the outer belt provided in the region of the forming element (132) of the Crescent former is formed by a wire fabric (128).

152. The device as claimed in one of claims 85 to 151, characterized in that the shoe press (118, 120) has a shoe length measured in the web running direction (L) which is greater than or equal to 80 mm and preferably greater than or equal to 120 mm.

153. The device as claimed in one of claims 85 to 152, characterized in that the line force produced by

the shoe press (118, 120) lies in a range from about 60 kN/m to about 90 kN/m.

154. The device as claimed in one of claims 85 to 153, characterized in that the maximum pressing pressure in the press nip of the shoe press (118, 120) is less than or equal to 2 bar and preferably less than or equal to 1.5 bar.

155. The device as claimed in one of claims 85 to 154, characterized in that the shoe press (118, 120) comprises a shoe press unit (120) having a blind-drilled press shell.

156. The device as claimed in one of claims 85 to 155, characterized in that the drying cylinder or Yankee cylinder (119) is provided with reinforcing ribs in the interior.

157. The device as claimed in one of claims 85 to 156, characterized in that the thickness (b) of the creping doctor (136) is less than or equal to 0.9 mm.

158. The device as claimed in one of claims 85 to 157, characterized in that the angle of attack ( ) between the tangent (176) to the drying cylinder (118) and the creping doctor (136) is less than or equal to 20°.

159. The device as claimed in one of claims 85 to 158, characterized in that the rake angle (β) of the creping doctor (136) is greater than or equal to 15°.